APPENDIX C BLOWOUT PREVENTION EQUIPMENT PROGRAM

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I. BLOWOUT CONTINGENCY PLAN

This plan describes actions and equipment aimed first at preventing blowouts and, in the event of uncontrolled well flow, the specific responses required to regain control and minimize hazards and damage.

A. In order to prevent blowouts the following precautions will be observed:
   1. Blowout prevention equipment will be kept in operating condition and tested in compliance with regulations and industry standards.
   2. During drilling operations, a minimum of 10,000 gallons of cool water and 12,000 pounds of barite will be stored at the well site for use in killing the well.
   3. When pulling or running pumps or conducting other well operations for which only clear fluid should be used to kill the well, the following precautions will be observed:
      a. For wells which are known to have a standing water level below ground level, a minimum 10,000 gallon supply of cool water will be available at the well.
      b. For wells which are known to have a standing water level near ground level or above, the following items will be kept at the well site:
         (1) a water supply as described above,
         (2) a tank and circulating pump for mixing up to 4,000 gallons of salt water kill fluid, and
         (3) a minimum of 6,000 pounds of sodium chloride salt or 15,000 pounds of calcium chloride salt, depending on the kill fluid density that will be required to kill the well.
   4. In the event of an emergency, such as a blowout, immediate efforts will be taken to shut surface valves and blowout preventer(s).

B. If the means to shut-in or control the flow from the well is lost, the Drilling or Workover Supervisor is to:
   1. Initiate appropriate control procedures.
   2. Arrange for any injured person to be transported by the fastest appropriate method to the nearest medical facility, as shown in the Injury Contingency Plan.
   3. Notify the Sheriff if there is a threat to local residents, at:
      Mono County Sheriff's Department
      Mammoth Lakes, CA
      911
   4. If fluid flow is of an uncontained nature, immediately dispatch personnel to attempt containment by constructing sumps and/or dikes as rapidly as possible and needed.
   5. Secure and maintain control of access roads to the area to eliminate entry of unauthorized personnel.
   6. Contact the Project Manager and advise of the situation.
   7. Follow applicable cleanup and abatement procedures of the Spill or Discharge Contingency Plan.
   8. Initiate any further or supplemental steps which may be necessary or advisable, based on consultation with the Project Manager.
   9. Be certain that all safety practices and procedures are being followed and that all members of the crew are performing their assigned duties correctly.
   10. Attempt to control the well at the rig site with rig personnel and supervisors.

11. Attempt to construct and/or fabricate and install any well head facilities required to contain fluid flow at the well or casing head.
12. Maintain a continuing inspection of the pad area immediately around the well site subject to erosion that could cause failure to the rig structure. Take necessary steps to avert possible erosion by excavation and rebuilding of the area as necessary.
13. Following complete containment of the well, initiate steps to return the area to its normal state prior to the blowout or fluid flow.

II. INJURY CONTINGENCY PLAN

In the event injuries occur in connection with a drilling operation, specific and immediate attention will be given to proper transportation to a medical facility.

Paramedics:

Mono County Paramedics
Mammoth Lakes (760) 937-3049 or 911
June Lake (760) 848-7234 or 911

Hospitals:

Centinela Mammoth Hospital
Sierra Park Road
Mammoth Lakes, CA
(760) 934-3311

Northern Inyo Hospital
150 Pioneer Lane
Bishop, CA
(760) 873-5811

Mono General Hospital
Bridgeport, CA
(760) 932-7011

III. FIRE CONTINGENCY PLAN

In the event of fire in connection with MPLP operations, immediate control attempts and appropriate notifications should be implemented in accordance with the following:

A. Any small fires which occur around the well pad during workovers, drilling or testing operations should be controlled by rig personnel utilizing on-site fire fighting equipment.

B. The Forest Service ((760) 934-2505) and local fire fighting agency should be notified of any fire, even if the available personnel can handle the situation or the fire poses no threat to the surrounding area.

C. A roster of emergency phone numbers is to be available on site so that the appropriate fire fighting agency can be contacted in case of a fire.

IV. SPILL OR DISCHARGE CONTINGENCY PLAN

The following plan is consistent with the Emergency Spill Containment Plan developed for prior MPLP Projects. The purpose of this plan is to: (1) identify potential sources of spills; and (2) define emergency response actions which will be initiated by rig and field development crews if a spill should occur during well drilling, testing or servicing operations.

A. Potential Sources of Accidental Spills or Discharges
   1. Geothermal Fluid
      a. Accidental geothermal fluid spills or discharges are very unlikely. However, accidental discharges or spills could result from any of the following:
         (1) Loss of well control (blowout)
         (2) Pipeline leak or rupture
         (3) Leakage from test tank.
   2. Drilling Muds
      a. Muds are mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit, to carry cuttings out of the hole, to maintain the hole integrity and to control formation pressure. Drilling muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud are unlikely, but could occur by:
         (1) Overflow of the reserve pit.
         (2) Reserve pit wall seepage or wall failure.
         (3) Discharge from equipment failure on location.
         (4) Shallow lost circulation channeling to the surface.
   3. Salt Water Kill Fluid
      a. Clear kill fluid is a solution of water and salt which will be necessary to kill some wells for pulling and running pumps or some workover operations. Only those wells which have a standing water level near or above ground level will be expected to require salt water kill fluid. For most such wells, 4,000 gallons or less of 14% (by weight) sodium chloride solution will be adequate. For wells with an unusually high shut-down surface pressure, it may be necessary to use a 30% calcium chloride solution. Specific fluid volumes and salt concentrations must be engineered for each application. These salts are natural components in the geothermal water and, except in the case of an accidental discharge, the kill fluid will be confined to a mixing tank and the geothermal production and injection reservoirs. Accidental discharges of salt water are unlikely, but could occur by:
         (1) Loss of well control after the kill fluid was in the well.
         (2) Discharge from equipment failure on location.
   4. Lubricating or Fuel Oils and Petroleum Products
      a. A discharge of this type will probably be very small and be from equipment used in the field. Potential locations for accidental spills are:
         (1) Drilling equipment and machinery at and around the drilling location.
            (a) Other miscellaneous equipment and machinery at well site and roads.
   5. Construction/Maintenance Debris
      a. Typically a minor consideration, one which is usually cleaned up on the job. Potential locations are the same as for lubricating or fuel oils listed in Idem d, above.

B. Plan for Cleanup and Abatement.

In the event of discharge of formation fluids, drilling muds, petroleum products or construction debris, the person responsible for the operation will make an immediate investigation, then contact the Drilling, Workover, or Plant Supervisor (as appropriate) and advise him of the spill. The Supervisor will in turn call out equipment, regulate field operations, or do other work as applicable for control and clean up of the spill, as follows:

1. Action - Small, Containable Spill
   If the spill is small (i.e., less than 250 gallons) and easily containable without endangering the watershed, the Supervisor will direct and supervise complete cleanup and return to normal operations.
2. Action - Large or Uncontainable Spill
   If the spill is larger than 250 gallons, or is not easily contained, or endangers, or has entered the watershed, the Supervisor will proceed to take necessary actions to curtail, contain and cleanup the spill, as above, and notify personnel as listed below.
3. Notifications
   a. The Supervisor will as soon as practical:
      (1) Call out contractor(s), as required.
      (2) Notify the Project Manager.
      (3) Notify the local law enforcement agencies if the public safety is threatened.
   b. The Project Manager will notify the following as soon as practical and work closely with them in all phases of the curtailment, containment and cleanup operations:

      Bureau of Land Management
      Bishop Area Office
      351 Pacu Lane, Suite 100
      Bishop, CA 93514
      (760) 872-4881

      Inyo National Forest
      Forest Supervisors Office
      351 Pacu Lane, Suite 200
      Bishop, CA 93514
      (760) 873-5841

      California Regional Water Quality Control Board
      Lahontan Region - Victorville Office
      15371 Bonanza Road
      Victorville, CA 92392-2494
      (760) 241-6593

      Mammoth Ranger District Office
      State Route 203
      P.O. Box 148
      Mammoth Lakes, CA 93546
      (760) 934-2505

      Project Manager
      Mammoth Pacific, L.P.
      P.O. Box 1584
      Mammoth Lakes, CA 93546
      (760) 934-4893

The Supervisor will also advise local population and affected property owners if spill affects residents or property.

c. Specific Procedures
   (1) For geothermal fluid or salt water spills:
   Contain spillage with dikes, if possible, and haul to approved disposal site by vacuum or water trucks or dispose of in a manner acceptable to the regulatory agencies including, the Regional Water Quality Control Board.

   (2) For drilling mud:
   Repair sump or contain with dikes. Haul liquid to another sump, available tanks or approved disposal site. Dry and solidify remaining material.

   (3) For petroleum products:
   Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.

   For IV.B.3.c.(1) through IV.B.3.c.(3), above, MPLP will have the source of spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

d. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Project Manager in writing within two weeks of telephone notification. Written confirmation will contain:
   (1) reason for the discharge or spillage.
   (2) Duration and volume of discharge or spillage.
   (3) Steps taken to correct problem.
   (4) Steps taken to prevent recurrence of problem.

V. EMERGENCY PERSONNEL AND TELEPHONE NUMBERS

Fire		
Inyo National Forest	Bishop	(760) 873-3300 or (Fire only) 911
	Mammoth Lakes	(760) 934-2505 or 911
Long Valley Fire Department	Crowley Lake	934-2200 or 911
Mammoth Lakes Fire Department	Mammoth Lakes	911
Law Enforcement		
Mono County Sheriff	Mammoth Lakes	(760) 934-6058 or 911
California Highway Patrol		911 or (760) 873-3531
Agency Representative		
U.S. Bureau of Land Management:		
District Manager	Bakersfield	(805) 861-4191
Area Manager	Bishop	(760) 872-4881
U.S. Forest Service:		
Forest Supervisor	Bishop	(760) 873-5841
Company Representative		
Mammoth Pacific, L.P.:		
Project Manager	Mammoth Lakes	(760) 934-4893

VI. HAZARDOUS GAS CONTINGENCY PLAN

To be Posted on Rig

Introduction

There is a possibility of encountering noncondensible gases during the drilling of a well. Although noxious or dangerous amounts of noncondesible gases, particularly hydrogen sulfide and ammonia, have not been associated with other wells drilled in the general area, it is necessary to be prepared in the unlikely event of an emergency. It is our intent to provide a safe working environment by taking measures not only to prevent the endangerment of personnel, but also that of public health, safety and the biotic environment.

The possibility of encountering ammonia gas is regarded as extremely remote. In addition, ammonia is considerably less toxic than hydrogen sulfide. Ammonia is included in the contingency plan to provide maximum safety and advance understanding should the improbable event of an emergency situation arise.

The effectiveness of this plan is dependent upon the cooperation and effort of each person who participates in drilling or working on wells. Each individual must know his responsibilities, not only under normal operating conditions, but also under emergency operating situations. Thus all personnel should familiarize themselves with the location and operations of all safety equipment and see that their own equipment is properly stored, easily accessible at all times, and routinely maintained.

General Information

All personnel involved with the mechanics of drilling, evaluating and testing the wells will be trained in the recognition of warning signals, the use of breathing equipment, individual and group responsibilities in case of emergency rescue or first aid, and other emergency procedures.

Each drill site shall have two briefing areas situated so that one will be upwind from the well at any given time. Before drilling begins, all personnel will be advised of an escape route other than the main access road.

A list of emergency phone numbers of personnel and agencies to be contacted in case of an emergency shall be posted in the following places:

1. Drilling Foreman’s trailer
2. Drilling crew’s dog house

Toxicity of Various Gases					
Common Name	Chemical Formula	Specific Gravity (SG) SG Air = 1	Threshold[1] Limit	Hazardous[2] Limit	Lethal[3] Concentration
Hydrogen Cyanide	HCN	0.94	10 ppm	150 ppm/hr	300 ppm
Hydrogen Sulfide	H_2S	1.18	10 ppm[4]	250 ppm/hr	600 ppm
Sulfur Dioxide	SO_2	2.21	5 ppm	-	1000 ppm
Chlorine	$C1_2$	2.45	1 00m	4 ppm/hr	1000 ppm
Carbon Monoxide	CO	0.97	50 ppm	400 ppm/hr	1000 ppm
Ammonia	NH_3	0.597	100 ppm	1700 ppm	5000 ppm
Carbon Dioxide	CO_2	1.52	5000 ppm	5%	10%
Methane	CH_4	0.55	90000 ppm	Combustible - above 5% in Air	

[1]Threshold Limit - Concentration at which is believed that all workers may be repeatedly exposed day after day without adverse effects.

[2]Hazardous Limit - Concentration that may cause death.

[3]Lethal Concentration - Concentration that will cause death with short-term exposure.

[4]Threshold Limit = 10 ppm - 1972 ACGIH (American Conference of Governmental Industrial Hygienists).

Physical Effects of Hydrogen Sulfide			
Percent	0 to 2 Minutes	15 to 30 Minutes	30 Minutes to a Hour
0.001 (10 ppm) - 0.002 (20 ppm	Detectable by “rotten-egg” smell	Detectable	Detectable. Maximum allowable concentration for 8-hour exposure without protective mask
0.01 (100 ppm)	Coughing, slight irritation of eyes. Loss of sense of smell.	Disturbed respiration. Pain in eyes. Sleepiness	Throat and eye irritation
0.025 (250 ppm)	Loss of sense smell.	Throat and eye irritation.	Throat and eye irritation.
0.035 (350 ppm)	Irritation of eyes. Loss of sense of smell.	Irritation of eyes and respiratory tract.	Painful secretion of tears, weariness; may cause death in longer exposure.
0.045 (450 ppm)	Irritation of eyes. Loss of sense of smell.	Difficult respiration. Irritation of eyes.	Increased irritation of eyes and nasal tract. Dull headache. Serious respiratory disturbance.
0.09 (900 ppm)	Coughing, unconsciousness. Serious respiratory disturbances.	Respiratory disturbances. Eye irritation. Unconsciousness.	Serious eye irritation. Slow pulse, rapid shallow breathing, respiratory paralysis, convulsion, asphyxia and death.
0.10 (1000 ppm)	Unconsciousness	Death	Death

Physical Effects of Ammonia Gas		
Concentration		Physical Effects
Percent (%)	PPM	
0.005	50	Odor Detectable. Prolonged Repeated.
0.01-0.02	100-200	No adverse effect for average worker. Exposure produces some discomfort but no lasting effects.
0.03-0.07	300-700	Produces nose and throat irritation and eye irritation with tearing. Exposure should be avoided but usually no serious after effects with short infrequent exposures.
0.17-0.30	1700-3000	Produces convulsive coughing and severe eye irritation. Dangerous for even short exposure. May be fatal.
0.5-1.0	5000-10,000	Produces respiratory spasm; rapid asphyxia. Exposure is rapidly fatal.

Safety Procedure, Equipment and Training

The following procedures apply primarily to drilling operations. For operations on existing wells which are known to not have dangerous concentrations of hazardous gases, the procedures relating to hazardous gases may be eliminated.

Training Program

A scheduled training program for all personnel and supervisors will be conducted at the beginning of the drilling program and for new hires on their first day of work. This program will assure that all personnel will be familiar with the location and proper use of safety equipment. They will be informed of prevailing winds. Briefing areas, and evacuation procedures.

Equipment

The drill site will be equipped with the following safety equipment for H_2S detection and personnel safety:

1. First aid kit, sized for the normal working number of personnel.
2. Stokes litter, or equivalent.
3. Wind direction indicating equipment at prominent locations.
4. Protective breathing apparatus of OSHA Standard for the working crew (Minimum of 2).
5. Wind socks or streamers, positioned to be readily visible from the rig floor and both briefing areas during both night and day.
6. Portable hand operated hydrogen sulfide detectors. These can also be utilized for detection of sulfur dioxide and ammonia. H_2S, SO_2 and NH_3 detector ampules will be readily available for spot checks.

There shall also be an adequate supply of H_2S scavenger chemicals on site to treat the mud system, should the mud become contaminated with hydrogen sulfide.
Warning signs will be available for posting on the access road to the location.

Drills

Drills with breathing equipment will be conducted for each crew, including the mud loggers and mud engineer. Each crew member will be instructed in utilization of the protective breathing apparatus.

Procedures for Operating Conditions

The Drilling Foreman or, in the event he is not present, the Drilling Contractor Tool Pusher in charge of the working crew will have full responsibility for safety precautions and will direct operations necessary to the safety and health of all personnel on the drill site.

Normal Operating Conditions

Prior to drilling into the first zone suspected of possible H_2S gas, all personnel will be instructed on the hazards of H_2S, and the location and the use of safety equipment onsite. They will also be informed of the H_2S monitors, their locations and the related alarm system along with the ventilation equipment, prevailing winds, briefing areas, and evacuation procedures.

Subsequent to penetrating into a possible H_2S bearing zone, a meeting will be held covering the above if not previously held.

Upon drilling into any suspected H_2S zone, the evolved gas will be monitored at the shaker. Should H_2S be present in concentrations between 10 ppm to 20 ppm, all personnel shall be advised.

H_2S and NH_3 Emergency Conditions

After H_2S and NH_3 have been detected, operations will proceed as follows:

Condition I - Potential Danger

Routine checking of the drilling fluid and the monitoring equipment will alert the mud loggers to the presence of hydrogen sulfide in concentrations less that 10 ppm. The mud loggers will notify the Drilling Foreman of the hydrogen sulfide concentrations. No danger to personnel exists as long as H_2S concentration remains below 10 ppm.

General Actions:

1. Personnel will be alert for any changes in H_2S concentrations.
2. All safety equipment, monitors and alarms will be checked for proper functioning.
3. Drills and review of emergency programs will be conducted.

Condition II - Moderate Danger

When H_2S concentration reaches 10 ppm.

General Actions:

1. All personnel on the rig and in the area of the mud pits will be advised to put on their breathing equipment.
2. The Drilling Foreman and the Drilling Engineer will be notified. Their instructions will be followed.
3. Steps to locate the source of H_2S will begin immediately. Required steps to suppress the H_2S will be taken. Drilling will not proceed until the source is determined, the well circulated, and the gas controlled.
4. All nonessential personnel will be sent out of the potential danger area.
5. All gas monitoring devices will be checked and gas monitoring activities with the portable hand operated gas detector unit will be increased.
6. The Drilling Engineer and Drilling Foreman will assess the situation, outline a control program, and assign duties to each person or group as required to bring the situation under control.
7. Access to the drill site will be limited to authorized personnel only.
8. If the H_2S concentration should rise to 20 ppm, warning signs will be posed on the access road(s) to the location indicating:

"DANGER - POISONOUS GAS"

"HYDROGEN SULFIDE - H_2S"

Condition III - Extreme Danger to Life:

This condition is reached when one or more of the following occurs: well control problems, poisonous gas exceeds threshold levels (as defined under "Toxicity of Various Gases"), and loss of well control.

1. All personnel will put on protective breathing equipment.
2. All personnel not required for well control or with perforated eardrums will proceed to the upwind briefing area for evacuation instructions.
3. The Drilling Engineer and Drilling Foreman will assess the situation, outline a control program, and assign duties to each person or group as required to bring the situation under control.
4. Any steps necessary and feasible to minimize environmental impacts will be taken.
5. The agency representatives will be notified.
6. If there is no hope of containing the well under prevailing conditions, and there is a definite threat to human life and property:
    a. The Emergency Plan will be initiated.
    b. The Blowout Action Plan will be referred to and followed.
    c. If all else fails, the well will be ignited. Instructions for igniting the well are as follows:
        i. Two people are required for the actual igniting operation. Both people will wear self-contained breathing units and will have 200' retrieval ropes tied around their waists. One person is responsible for checking the atmosphere for explosive gases, the other is responsible for lighting the well. Personnel not assigned special duties will be kept within the safe briefing area. Those in the safe briefing area will be alert to the needs of the two people assigned to ignite the well. Should either of these people be overcome by fumes, they will immediately pull them to safety by the retrieval ropes.
        ii. The primary method for igniting the well is a 25 mm meteor type flare gun. It has a range of approximately 500'. If this method fails or well conditions are such that a safer or better method is apparent, then the alternate should be used.

iii. If the well is ignited, the burning hydrogen sulfide will be converted to sulfur dioxide which is also poisonous. Thereafter, DO NOT ASSUME THAT THE AREA IS SAFE AFTER THE GAS IS IGNITED. CONTINUE TO OBSERVE EMERGENCY PROCEDURES AND FOLLOW THE INSTRUCTIONS OF SUPERVISORS.

d. Initiate the program to kill, plug and abandon the well.

Emergency First Aid Procedures

While extensive preparations for personnel safety have been made, all personnel should be aware of first aid procedures in the event of an accident. First aid for H_2S and/or NH_3 victims is based primarily on moving the victim to fresh air immediately.

1. Warning - Do not jeopardize your own safety. Always wear a self-contained breathing apparatus while attempting rescue.
2. If people are trapped or unconscious in an ammonia vapor cloud, the ammonia vapor in their immediate area can be reduced considerably by use of a water fog or spray. Since ammonia is water soluble, a water fog or spray is effective in removing the gas from the surrounding atmosphere, a fog nozzle can be attached to a fire hose and the fire hose turned on, playing the stream of spray or fog through the ammonia vapor to form an ammonium hydroxide (NH_4OH) fog, which condenses as it cools and will fall to the ground. This technique could also be used to protect personnel trying to approach a leaking line or valve to make repairs ro shut down equipment.
3. If a victim is unconscious and not breathing, immediately move the victim to a safe breathing area and apply an approved method of artificial respiration, continuing without interruption until normal breathing is restored.
4. Symptoms may pass rapidly, but keep the victim warm and transport him to a hospital under the care of a physician as soon as possible.

VII. BLOWOUT ACTION PLAN FOR DRILLING

To Be Posted on Rig

1. The hole is to be kept full of drilling or completion fluids at all times unless this becomes impossible due to lost circulation.
2. Before starting out of hole with drillpipe or tubing, circulate off bottom until mud is properly conditioned.
3. Close and open rams and annular preventer once per day and log on tour sheet. Pressure test BOPE prior to drilling out of casing shoes and coincident with casing test. Log results on blowout preventer check list.
4. Close blind rams or master valve when out of hole and log on tour sheet.
5. Fill hole at five (5) stand intervals or less while pulling drillpipe out of hole. Count pump strokes or use chart attached to the pit volume indicator to determine the volume required to fill the hole.
6. Watch pit flow or pit level indicator when running in the hole to insure that the volume of mud displaced by the drillpipe is not exceeded.
7. The drillpipe will be run in the hole to the shoe of the casing with the inside BOP installed to perform any of the following operations:
   a. Slip and cut drilling line.
   b. Repair equipment (if possible).
   c. Any foreseen delay.
8. Record reduced circulating pressure at 30 strokes per minute (SPM) or other suitable kick control SPM daily and after each bit change.
9. An approved inside blowout preventer and full opening safety valve with wrench must be immediately available on the rig floor.
10. A blowout prevention drill will be conducted by the rig tool pusher under the supervision of the Drilling Supervisor for each drilling crew to ensure that each person is properly trained to carry out emergency procedures. Assign kick control duties in advance: i.e., mud mixing assigned to floorman, operating pumps assigned to derrickman, etc.
11. At first indication of gain in pit level (or other sign of possible blowout), the driller will immediately do what is necessary to control the well. In most cases this action should be:

    While Drilling:

    a. Pull kelly up out of rotary table and stop pumps.
    b. Open valve(s) on choke line.
    c. Close the blowout preventer and gradually reclose choke line.
    d. Record shut-in drillpipe (Pdp) and casing (Pcg) pressure. Maximum allowable casing pressure to be dependent on casing depth and burst rating. Allowable pressure for each string to be posted and noted in driller's instructions and on well control data sheet.
    e. Inform the Drilling Supervisor and/or proceed with appropriate kick control measures as follows in Step 12.

    While Tripping

    a. Install full opening safety valve.
    b. Open valve on choke line(s).
    c. Close safety valve.
    d. Close blowout preventer and gradually reclose choke valve(s).
    e. Record shut-in drillpipe and casing pressure. Maximum allowable casing pressure to be dependent on casing depth, mud weight and burst rating.

f. Inform the Drilling Supervisor. Run drillstring in hole as far as practical after first installing inside BOP and reopening safety valve, and/or proceed with appropriate kick control measures as follows in Step 12.

12. Open choke line, start pump and run at 30 SPM or other previously set SPM while adjusting choke line valve to set drillpipe circulation pressure equal to normal circulation pressure at 30 SPM or other previously set kick control SPM, plus shut-in drillpipe pressure.

13. Calculate and mix mud of weight necessary to keep well under control using the well control worksheet and attached nomograph

$$\text{Mud weight increase in lb/ft3} = \frac{\text{Pdp x 144}}{\text{Drillstring depth in feet}} + 3 \text{ lb/ft3}$$

14. When sufficient volume of proper weight mud has been prepared, start pumping the weighted mud through the drillpipe at constant kick control SPM which will reduce circulating pressure downward gradually from Pi (initial drillpipe circulating pressure) as calculated on the well control worksheet to Pf (final drillpipe circulating pressure) when drillpipe is filled with weighted mud. Thereafter, hold drillpipe pressure constant at Pf by adjusting choke valve until properly weighted mud returns to surface.

15. When properly weighted mud returns to surface, stop pumps, release any remaining pressure on casing, and check for additional kick before returning to normal operations.

16. Drill new directional hole as a last resort to kill well.

VIII. BLOWOUT ACTION PLAN FOR PULLING AND RUNNING WELL PUMPS

To Be Posted on Rig

1. The well will be killed and kept dead during the running and pulling operations by one of the following methods:
   a. For wells which are known to have a standing water level below ground level, maintain a flow of cool, fresh water into the well.
   b. For wells which are known to have a standing water level near or above ground level, kill the well with salt water and monitor the water level frequently. Maintain an adequate supply of salt on location and inject more kill fluid if necessary to keep the well dead.
2. A safety valve will be kept on the rig platform at all times and will be used to shut in the column pipe: (1) in the event of a delay in the pulling or running operation; (2) when the well is unattended; and (3) to control a blowout.
3. Use a double ram BOP on the well. Close and open pipe rams once each shift and log on the tour sheet.
4. Close blind rams when pump is out of the hole.
5. Close pipe rams: (1) in the event of a delay in the running or pulling operation; (2) when the well is unattended; and (3) to control a blowout.